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Recovery of ostracod with known ages in differently textured sediments and comparison of toxicity of heavily contaminated sediments with ostracod Heterocypris incongruens and amphipod Hyalella azteca

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Abstract

© Published under licence by IOP Publishing Ltd. The recovery of 1-, 4-, 6,-, and 8-d-old ostracods (Heterocypris incongruens) from sediments with different texture has been evaluated. The recovery of ostracods at all ages has been in agreement with the acceptability criterion of 80% of survival for sediment tests. The recovery of ostracods has turned out to be equal to or more than 80% for sand and silt sediments, respectively. The comparison of survival rates between ostracods and amphipods has shown good convergence in the tests of heavily contaminated sediments ($R2=0.75$, $p<0.05$). The sediment quality criteria (TEC) have been exceeded mostly for total petroleum hydrocarbons (100% samples), Cr (100%), Ni (87%), Cu (87%), Pb (47%), and Cd (53%). The content of acid volatile sulfides (AVS) has been significantly higher than that of simultaneously extracted metals (SEM). The obtained results have indicated that, metals (Cu, Zn, Cd, Ni, and Pb) are non-bioavailable. Only one sample has exceeded TEC for PAHs (dibenz[a,h]anthracene). It was observed that, no significant correlation between the effect of toxicity and the chemical content.

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References

[1] Kemble N E, Brumbaugh W G, Brunson E L, Dwyer F S, Ingersoll C G, Monda D P and Weodward D F 1994 Environ. Toxicol. Chem. 13 1985-97

[2] Baudo R 2008 Ann. Ist. Super. Sanita 44 233-38

[3] Bakaeva E N, Nikanorov A M and Ignatova N A 2009 Nauka Yuga Ross. Sci. S. Russ. 5 84-93 (In Russian)

[4] Whitacre D M 2012 Reviews of Environmental Contamination and Toxicology (Springer Science & Business Media) 182

[5] De Cooman W, Blaise C, Janssen C, Detemmerman L, Elst R and Persoone G 2015 Knowl. Manage. Aquat. Ecosyst. 416

[6] Chial B and Persoone G 2002 Environ. Toxicol. 17

[7] Chial B, Persoone G and Blaise C. 2003 Chemosphere 52

[8] 2012 ISO 14371Water quality - Determination of fresh water sediment toxicity to Heterocypris incongruens (Crustacea, Ostracoda) ISO Water quality 16

[9] 2013 ISO 16303 Water quality - Determination of toxicity of fresh water sediments using Hyalella Azteca ISO Water quality 27

[10] 2015 Annual Book of ASTM Standards 11 (West Conshohocken, PA: ASTM International) Standard practice for total digestion of sediment samples for chemical analysis of various metals (D4698-92)

[11] De Deckere E, de Cooman W, Florus M and Devroede-Vanderlinden M P 2000 A manual for the assessment of sediments in Flanders with the Triad approach (Flemish: Ministry of the Flemish Community in collaboration with the Flemish Environmental Agency) 112

[12] 2006 ISO 18287 2006 Soil quality - Determination of polycyclic aromatic hydrocarbons (PAH) - Gas chromatographic method with mass spectrometric detection (GC-MS) ISO Soil quality 17

[13] MacDonald D D, Ingersoll C G and Berger T A. 2000 Arch. Environ. Contam. Toxicol. 39

[14] Stepanova N Y, Latypova T R and Latypova V Z. 2015 Neft. Khoz. Oil Ind. 3 106-9

[15] Tomacovic M J, Dwyer F J, Greer I E and Ingersoll C G 1995 Environ. Toxicol. Chem. 14